

California Freight Advisory Committee

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Outline

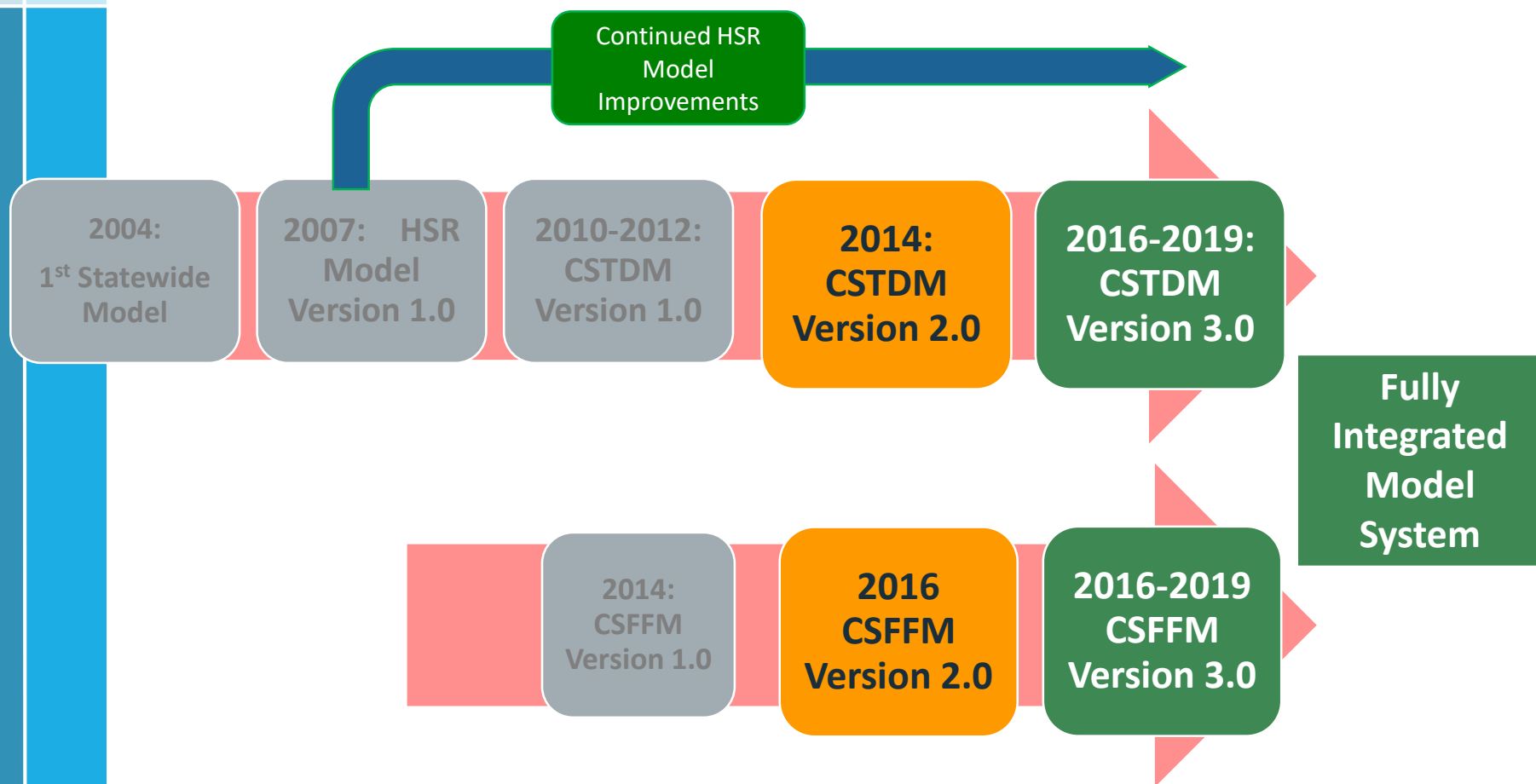
- I. California Freight Forecasting Model (CFFM)
 - A. Background
 - B. Update
 - C. Applications
- II. Other Tools
 - A. California Congestion Analysis Map (F&P)
 - B. Metrans
- III. Performance Measures
 - A. MAP-21
 - B. Reliability
 - C. Target Setting



CFFM

1. Background
2. Update
3. Applications

Statewide Modeling History



CSTDM – California Statewide Travel Demand Model
CSFFM – California Statewide Freight Forecasting Model
HSR Model – High Speed Rail Model



Right model for right job

Statewide Model

CTP 2050,
Freight
Mobility Plan,
ITSP

Inter-regional
Travel

Regional Models

RTP/
SCS
Ports Model

Regional
Policy
(i.e., managed lanes)

County Models

County-wide
Transport.
Plan

FTA New
Starts

Local/City Models

General Plan

Local Traffic
Impact Study



CSFFM Update Overview

- › Fully integrated CSFFM within CSTDM*
 - Can now examine impacts of truck/freight policies on trucks and passenger vehicles
- › Better data!
 - CA-VIUS, GPS O-D (Big Data), FAF 4, truck traffic counts
 - Better data : Better models : Improved decision-making
- › New base and future year forecasts
 - Data from MPOs
- › Enhanced usability and staff training

**California Statewide Travel Demand Model*



Primary Use of CSFFM

- › Statewide policies related to goods movement/freight
- › Interregional, interstate, international “what-if” analyses
- › Rural analyses (for areas where regional models do not exist)

Areas of Improvement

- › NON-freight trucks not well understood
- › Huge changes to transportation/logistics
 - Example: Autonomous/connected vehicles
 - Example: E-commerce
 - › Changes in warehousing and just-in-time delivery
 - › Last mile deliveries (Uber for freight)
 - › ZEVs
- › Small vehicles used for both personal and commercial purposes
 - Example: Passenger vehicles used for personal reasons and as Uber drivers.
- › Visitor travel not include in CSTDM
- › New modes of travel
 - Scooters
- › New innovations in travel and logistics

Primary CSFFM Applications

- › **Land use scenarios**
 - Population
 - Employment by industry
- › **Corridor analyses**
 - Capacity expansion
 - New facility
 - Network performance
- › **Air quality analysis**
 - GHG
 - PM
- › **Mode shift analyses**
 - Trucking cost/ toll / fuel prices
 - Rail network access / rates
- › **Economic /Industry analyses**
 - Regional Commodity flow
 - Ports' traffic
 - Import/ export distribution

CFFM

- › Potential Scenarios – CTP/CFMP
 - Impact on VMT if triple trailers allowed in CA (i.e. in theory fewer trucks to move goods)
 - Short sea shipping (goods on barges through delta – M580)
 - Adding truck only lanes (SR 99 in Central Valley)
 - High Speed Freight Rail? (using same HSR system)
 - Autonomous trucks
- › Statewide analysis
- › Interregional analysis – freight ideal
- › Rural areas – limited models

Next Steps:

- › Finalize base year updates
- › Static Validation:
 - Truck Trip Distribution
 - Highway Network Assignment
 - Travel Time
- › Dynamic Validation/ Sensitivity analysis :
 - Land Use Test
 - Highway Network Modification Test
 - Mode shift Test

California Congestion Analysis Map

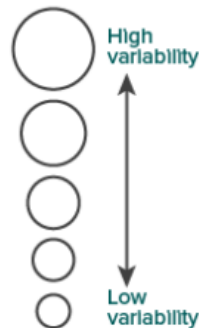


CALIFORNIA CONGESTION ANALYSIS MAP

The map shows information from the National Performance Management Research Data Set (NPMRDS) and the Caltrans Performance Monitoring System (PeMS). Variability and congestion indices are shown using the multi-variable scale shown here.

FEHR  PEERS






VARIABILITY INDEX



High variability indicates that speeds may change dramatically compared to the mean during the peak period.

Low variability indicates that travel on that segment is predictably going to be similar during the peak period, regardless of how slow or fast traffic moves on that segment.

STANDARDIZED CONGESTION INDEX

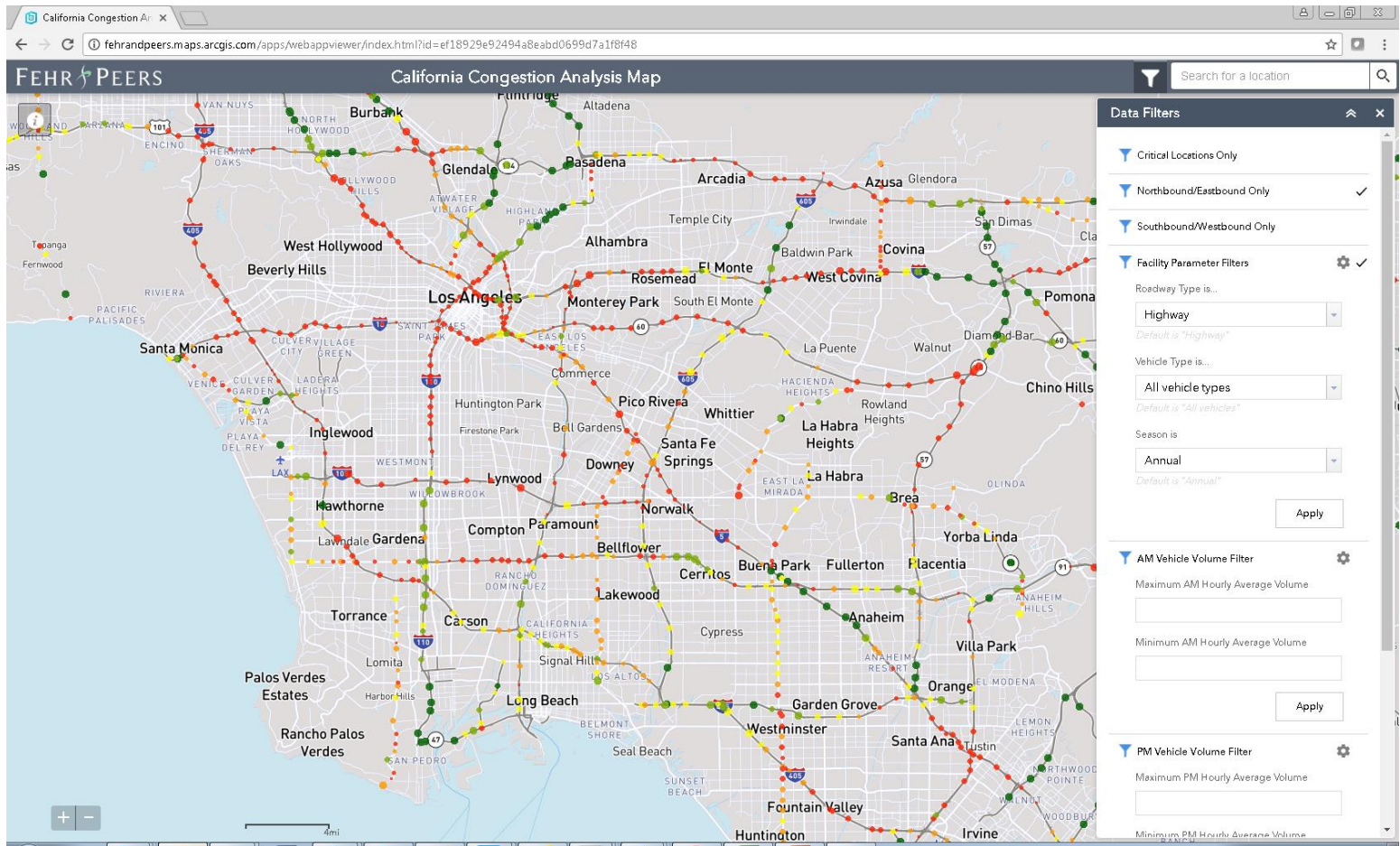
-  0%-20% lower
-  20%-30% lower
-  30%-40% lower
-  40%-50% lower
-  More than 50% lower

The standardized congestion index (SCI) is a measure of comparing the worst peak period speed to the estimated free-flow speed.

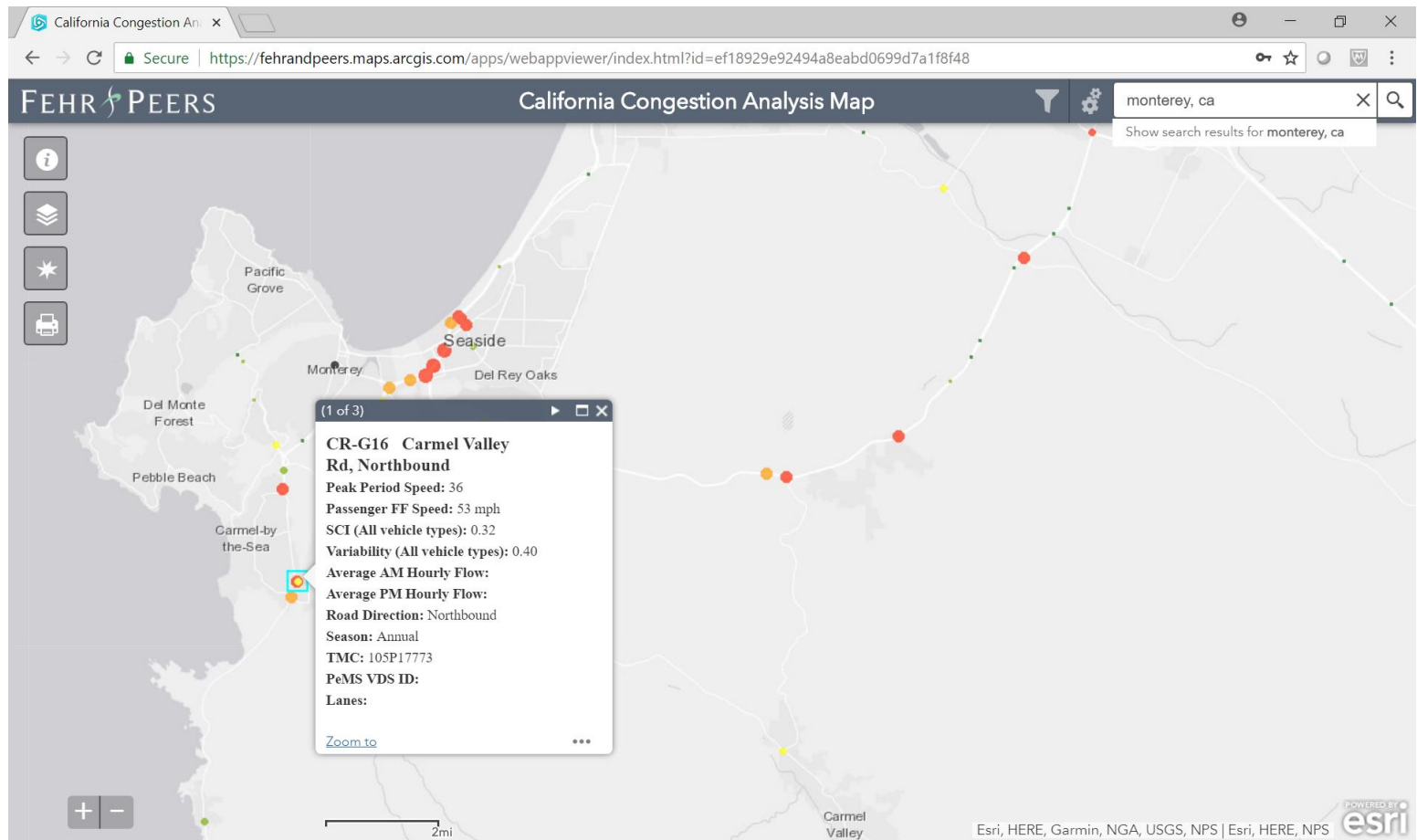
For example, an SCI of 0.25 means that speeds during the worst peak period are estimated to be 25% less than the free-flow speed.

OK

California Congestion Analysis Map



California Congestion Analysis Map



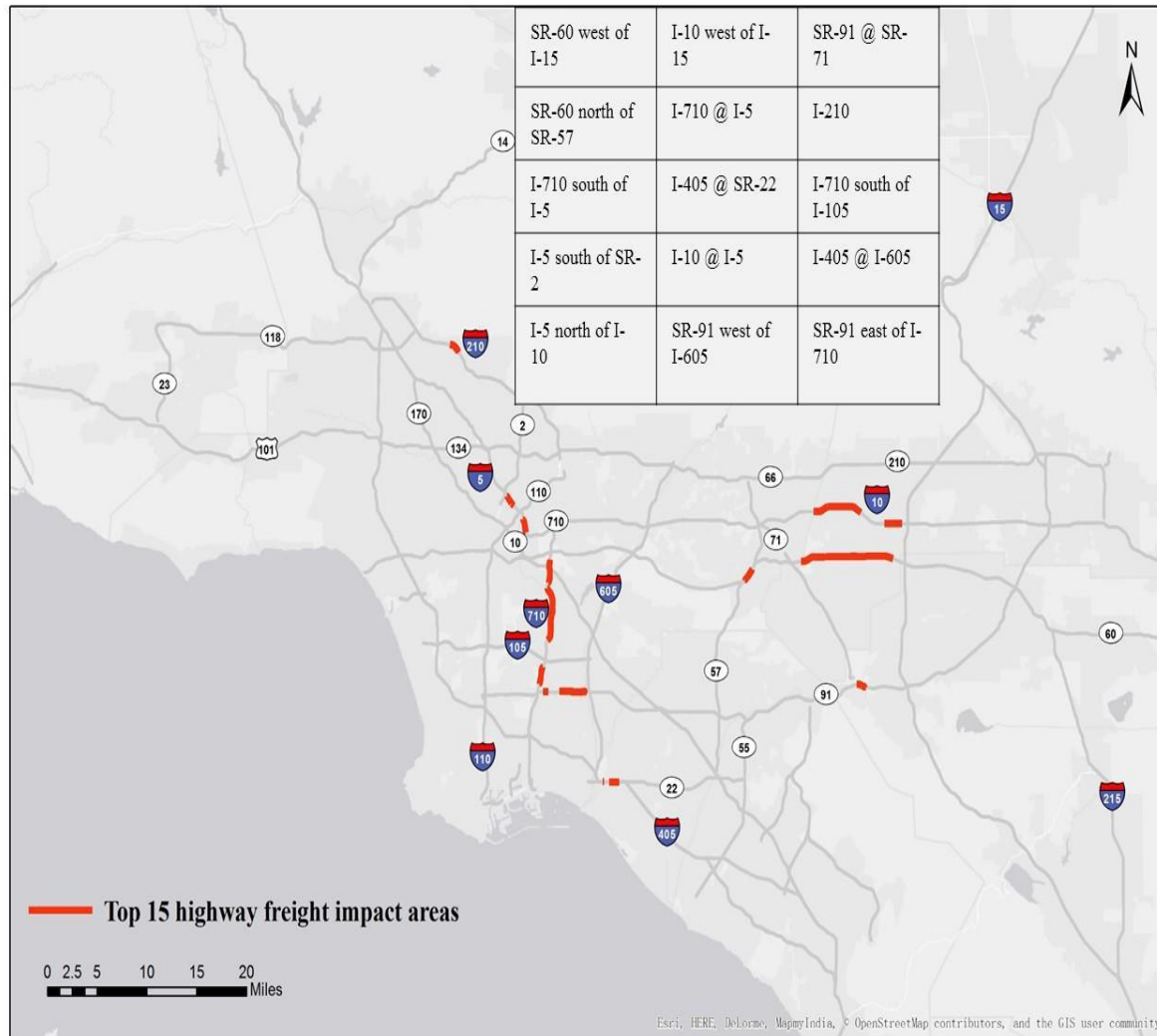
METRANS

- › No prior research on identifying congestion *caused* by freight.
- › Where are freight volumes high enough to significantly contribute to total congestion?
- › Developed a new methodology to define freight impact areas.

METRANS cont...

- › **Freight impact area** defined as *a severely congested roadway corridor with high volumes of trucks.*
- › By applying the methodology to Los Angeles and San Francisco, we identify the top 15 highway freight impact areas and top 15 arterial freight impact areas for each region.
- › Another 15 top highway freight impact areas in the rest of California (outside of LA and SF) are also identified using PeMS data.

Top 15 freight impact areas on the National Highway System during PM peak hours in the Los Angeles region



METRANS cont...

- › Suggest the development of performance measures and indicators respectively for:
 - the evaluation on project implementation;
 - project-strategy connection; and
 - strategy effectiveness.

Project Prioritization

- ›Objective: Develop an easy, transparent and consistent methodology to quantify traffic conditions at different levels to support project prioritization.



FREIGHT PERFORMANCE MEASURES

- Why measure?
- Available data
- Potential Measures
- Challenges
- PM3

Why Measure?

- › Provide the most efficient investment of Federal transportation funds
- › Refocus on national transportation goals
- › Increase accountability and transparency
- › Improve decision-making through performance-based planning and programming

Available Data



§ 490.609 Data Requirements: Freight Reliability

Relevant Data	Data Source Options
<ul style="list-style-type: none">• Truck travel times• Interstate travel time segments	<ul style="list-style-type: none">• NPMRDS, <i>OR</i>• Equivalent data set



Potential Measures

- › Delay
- › Reliability
- › Speeds
- › Safety
- › Pavement Quality

Challenges

- Setting Freight Goals
- Lack of Consistency
- Incomplete Data
- Applying the Measures
- Data Capture
- Integrating Data
- Sustaining Freight Performance Measures

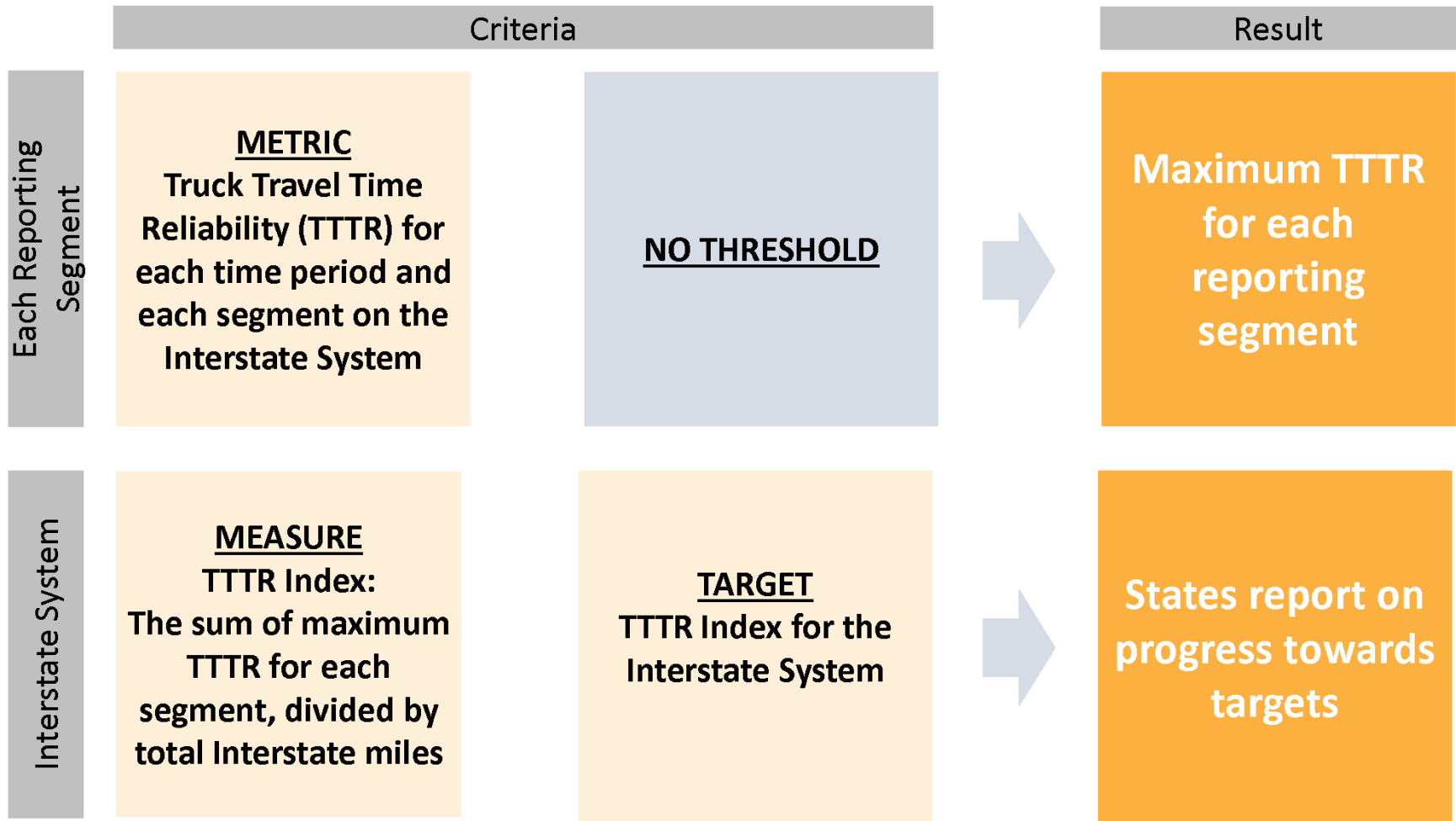
Performance Measure 3

- › MAP-21 required the establishment of performance measures for DOTs and MPOs.
- › PM3 assesses:
 - National Highway System (NHS) for Interstate and non-Interstate components
 - Freight movement on Interstate System
 - CMAQ Program for traffic congestion and on-road mobile sources
 - Greenhouse Gas (GHG) Emissions [repealed]

Performance Measure 3

- › Freight
- › Truck Travel Time Reliability (TTTR) Index
- › Five time periods
- › TTTR ratio will be generated by dividing the 95th percentile time by the normal time (50th percentile) for each segment.

§ 490.607 Freight Reliability Measure



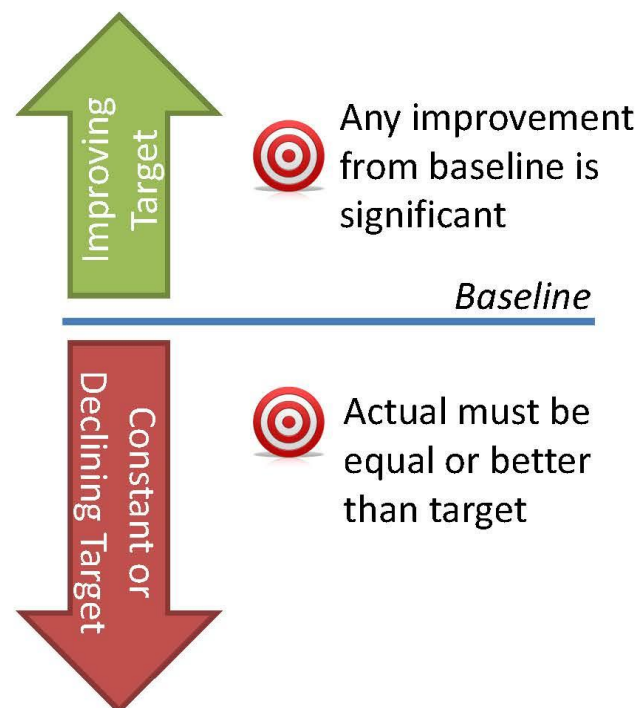
Accountability and Transparency in Performance Management

Significant Progress

- State Establishes Targets
 - Improving, Constant or Declining
- Determination
 - Is the actual equal or better than the established target?

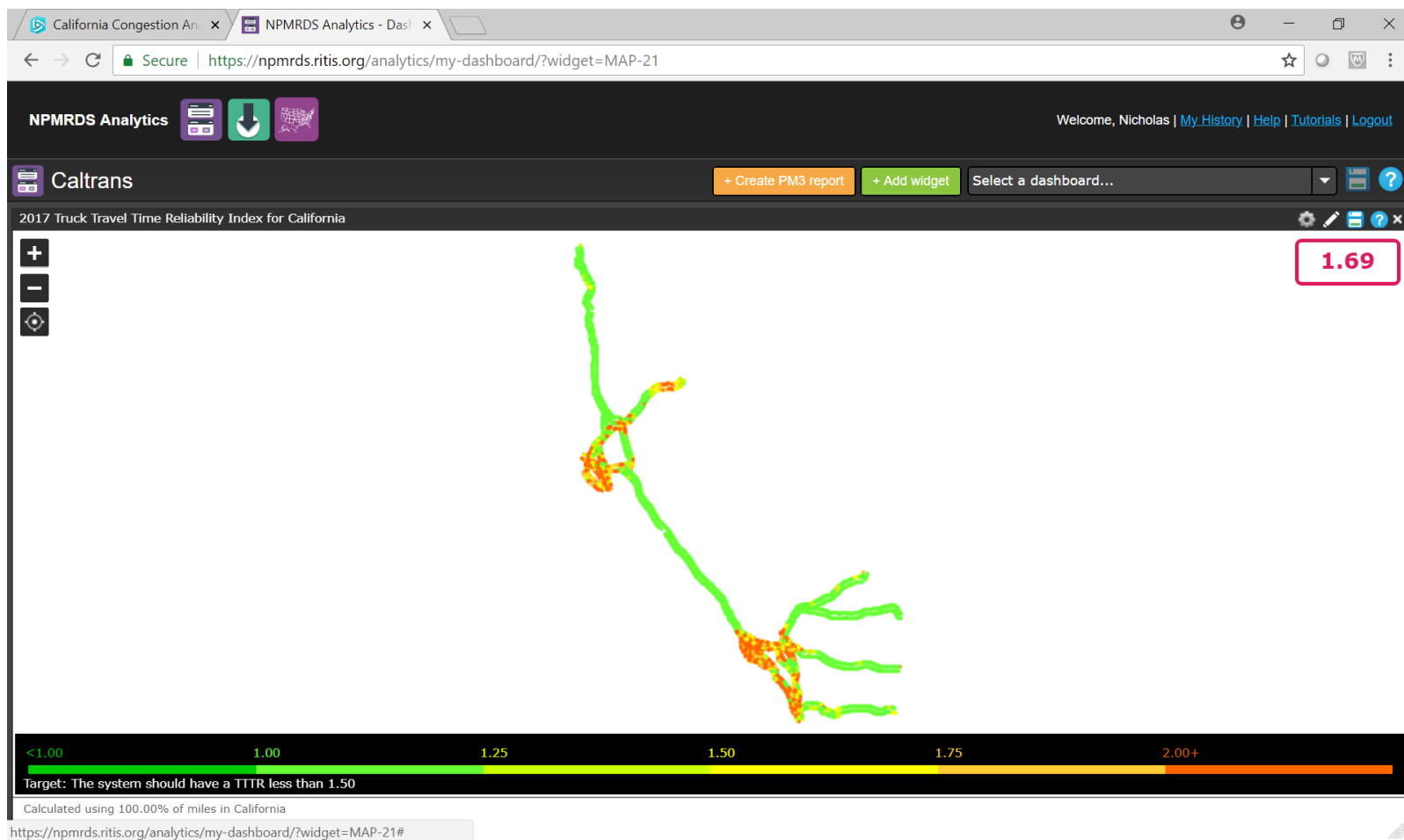
OR

 - Is the actual better than the baseline?





CA Freight Reliability 1.69



PM 3 Targets

Performance Measure	2017 Baseline Data	2-year Target	4-year Target
Percent of Reliable Person-Miles Traveled on the Interstate ¹	64.6%	65.1% (+0.5%)	65.1% (+0.5%)
Percent of Reliable Person-Miles Traveled on the Non-Interstate NHS ¹	73.0%	N/A	74.0% (+1%)
Percentage of Interstate System Mileage Providing Reliable Truck Travel Time (Truck Travel Time Reliability Index) ¹	1.69	1.68 (-0.01)	1.67 (-0.02)
Total Emissions Reductions by Applicable Pollutants under the CMAQ Program ²			
VOC (kg/day)	951.83	961.35 (+1%)	961.35 (+1%)
CO (kg/day)	8,385.20	8,351.90 (+1%)	7,000.54 (+2%)
NOx (kg/day)	1,753.36	1,770.89 (+1%)	1,788.43 (+2%)
PM10 (kg/day)	2,431.21	2,455.52 (+1%)	2,479.83 (+2%)
PM2.5 (kg/day)	904.25	913.29 (+1%)	922.34 (+2%)
*Annual Hours of Peak-Hour Excessive Delay Per Capita ³	State and MPO must coordinate on a single, unified 4-year target.		
Sacramento UA	14.9 Hours	N/A	14.7 (-1.0%)
San Francisco-Oakland UA	31.3 Hours	N/A	30.0 (-4.0%)
San Jose UA	27.5 Hours	N/A	26.4 (-4.0%)
Los Angeles-Long Beach-Anaheim UA	51.7 Hours	N/A	51.2 (-1.0%)
Riverside-San Bernardino UA	16.3 Hours	N/A	16.1 (-1.0%)
San Diego UA	18.4 Hours	N/A	18.0 (-2.0%)
*Percent of Non-Single Occupancy Vehicle (SOV) Travel ³	State and MPO must coordinate on a single, unified 2-year and 4-year target.		
Sacramento UA	22.8%	23.3% (+0.5%)	23.8% (+1%)
San Francisco-Oakland UA	44.3%	45.3% (+1%)	46.3% (+2%)
San Jose UA	24.5%	25.5% (+1%)	26.5% (+2%)
Los Angeles-Long Beach-Anaheim UA	25.6%	26.1% (+0.5%)	26.6% (+1%)
Riverside-San Bernardino UA	22.7%	23.2% (+0.5%)	23.7% (+1%)
San Diego UA	23.8%	24.8% (+1%)	25.2 (+1.4%)
Percent Change in Tailpipe CO ₂ Emissions on the NHS Compared to the Calendar Year 2017 Level (Greenhouse Gas performance measure) ⁴	TBD	TBD	TBD

*Pending final MPO approval.

¹ Source: NPMRDS Analytics Tool (<https://nmpmrd.rttis.org/analytics/>)

² Source: CMAQ Public Access System (https://thwaapps.fhwa.dot.gov/cmaq_pub/)

³ Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates

⁴ State must establish target no later than September 28, 2018

Next Steps

- › Submit Baseline Report 10/1/18
- › Monitor Data
- › 2-Year Report
- › Evaluate
- › 4-year Report
- › Big Picture: Program projects to support target
- › Consequences